Science News-Letter

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GENERAL SCIENCE

Scientists Honor Memory of Sir Isaac Newton

Why Newton is Remembered

By PAUL R. HEYL

Dr. Heyl is physicist at the United States National Bureau of Standards and is an authority on gravitation and the newer physics.

The 20th of March of this year is the 200th anniversary of the death of one of the greatest scientific men of all time—Sir Isaac Newton. His long life of 85 years comprised many different activities. As a young man he practised alchemy. He wrote many theological treatises; he was a professor at Cambridge University, and for the last 30 years of his life he was the Master of the British Mint. But upon none of these does his fame rest. Hundreds of men have equaled or exceeded Newton in such respects, and all have been swept by relentless time into the limbo of mediocrities.

Why is Newton remembered? Not primarily for his experimental work in optics, important as this is, for a dozen others have done as well. Not because he "discovered gravitation"; that had been known since the days of Aristotle. Not because he formulated the exact law according to which gravitation acts, for that appears to have suggested itself to at least three of his contemporaries. Not that he was the first to conceive the idea that the earth's gravitative attraction might reach as far as the moon; that had been imagined before him, though no demonstration of it had been given.

Newton stood head and shoulders above his contemporaries because he had vision, a broad mental grasp, a good sense of perspective. Scientific knowledge before his day consisted chiefly of isolated facts of observation, with little or no correlation, and no satisfactory assigned causes. But Newton was able to visualize all the moving bodies in the universe from comets to falling apples, and to

SIR ISAAC NEWTON

demonstrate that they all obeyed a single law—universal gravitation. He brought order out of chaos; he had constructive talent; he was a builder, not only a collector of building materials. It was nearly 200 years after the publication of the "Principia" before the scientific world saw its like, until Darwin, with the "Origin of Species" did for biological science what Newton had done for physical science two centuries earilier. Such men are rare, but scientific progress would be impossible without them.

How thoroughly Newton accomplished this task is evidenced by the change in scientific thought since his day. The "Principia" is taken for granted; the picture of the universe set forth in it is part of our common heritage, almost innate. Newton succeeded in endowing all scientific posterity with a measure of that vision and perspective which he alone possessed in his day. He said modestly of himself: "If I saw farther, 'twas because I stood on giant shoulders." But by the hands of Newton we have been lifted and placed upon a peak which he himself could not reach, from which, like Moses of old, we may look over the Promised Land, though it may be reserved for those who follow us to enter.

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Newton and Gravitation

Say "Newton" and the response is "gravitation" just as to say "Einstein" brings to mind "relativity." Although Sir Isaac Newton will always be known and honored by science for his researches upon the binomial theorem, the method of tangents, the differential and integral calculus, and theory of colors, he will probably be most widely known for his work on the law of gravitation.

Legend has it that Newton's attention was forcibly called to gravitation by the fall of an apple upon his head as he rested beneath an apple tree. Voltaire is the authority for this anecdote and he is said to have obtained his information from Newton's favorite niece. But whether the apple legend is true or untrue, it is a fact that Newton's thoughts and researches upon gravitation have changed our conceptions of the universe. He began his researches when a lad of but 24 years; in fact, of 1665 and 1666 when the plague had driven him and all other students from Cambridge, Newton said: "I was in the prime of my age for invention, and minded Mathematics and Philosophy more than at any time since."

The great Galileo died the year Newton was born and it was his

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Sir Isaac Newton

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invention of the telescope and his planetary observations that prepared the way for Newton's discovery. John Kepler, follower of the master astronomer, Tycho Brahe, had reduced to simple laws the movements of the planets, most important of which was the fact that they moved in elliptical orbits around the sun at one of the two foci. Why should a planet swing a closed orbit around the sun instead of shooting off in a straight path? The mathematical genius of Newton proved that if there existed an attracting force between the sun and the earth that varied inversely proportional to the square of the distance between the two bodies, the earth would sweep the identical orbit around the sun that Kepler had observed. Experience with falling bodies and the weight of things suggested that the earth attracts bodies far from it just as it attracts a falling stone. Again Newton's calculations proved his theory right and the moon was shown to be but an immense stone ever falling toward earth and so kept in its orbit. The earthly force of gravity became a heavenly force as well.

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As Newton Saw Truth

"I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."—*Sir Isaac Newton as given in Brewster's Memoirs.*

Science News-Letter, March 19, 1927

It is estimated that an automobile engine wastes 97 per cent. of the energy of gasoline.

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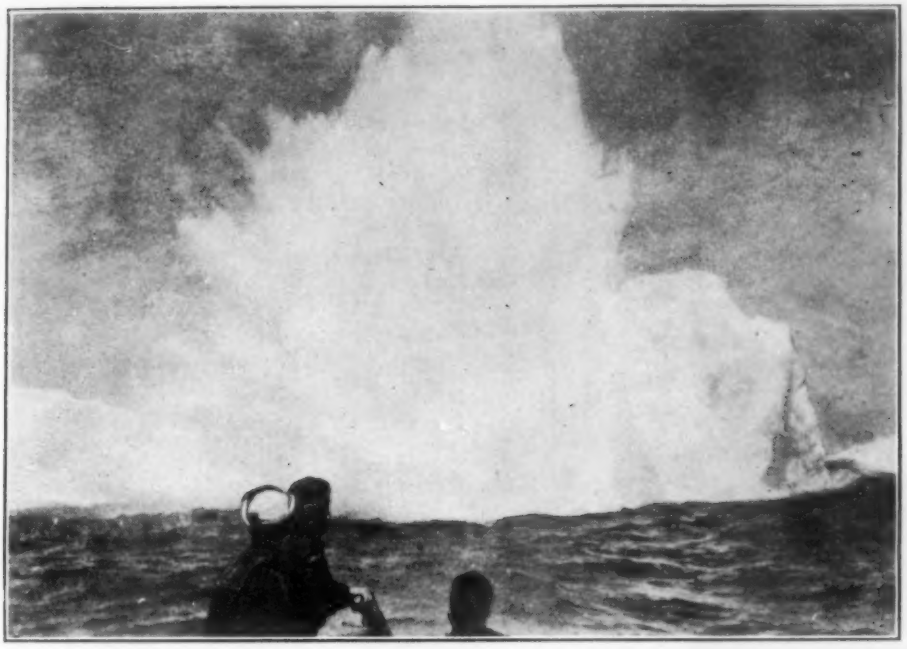
Coast Guard Now On Watch For Icebergs



PULLING THE TEETH FROM THE ICEBERG MENACE. One of the duties of the Ice Patrol of the U. S. Coast Guard is to destroy large icebergs when possible, frequently by blowing them up with T. N. T.

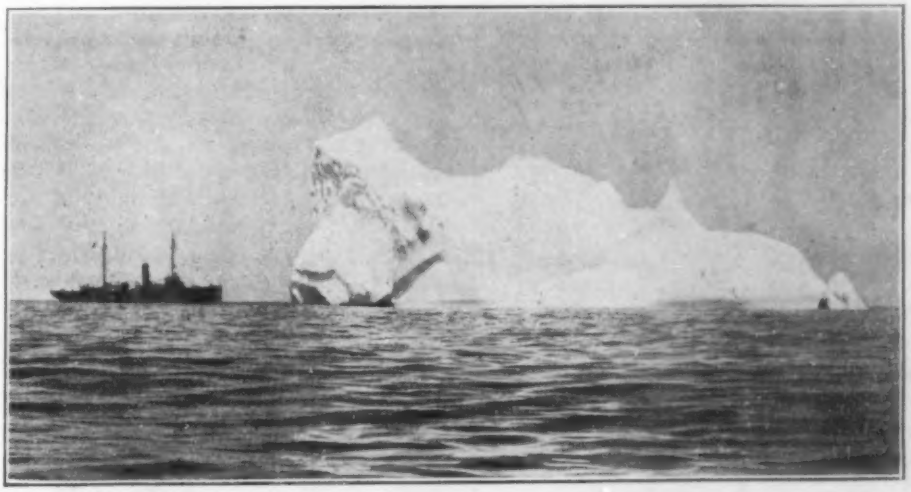
March, and the beginning of spring, mean the beginning of warmer weather, and relief from the ice and snow of winter to most people. To the skipper of a boat that travels between the United States and Europe, however, it means the beginning of increased watchfulness for icebergs, for this is the time of year when they are at their height. It was on April 14, 1912, when one of the worst of ice accidents occurred—the sinking of the *Titanic* by collision with a huge iceberg. Miles of ice fields and hundreds of icebergs threaten shipping at various points south of Newfoundland at this time of year, and the danger is increased because at the same time the region is very apt to be enshrouded with fog.

On account of this danger, something must be done, and two things are possible. In the first place, the skippers can, and do, when possible, choose tracks which take them to the south of the region of the ice, even though it is a little longer. But if the locations of the big bergs are known, they can avoid them, and the Ice Patrol is now starting on its work to locate and warn of them.

"The history of the Ice Patrol dates from the Titanic disaster," said Lieutenant Commander Edward H. Smith, of the U. S. Coast Guard the other day, in discussing the way in which the government is protecting American and foreign navigators, and the passengers on their boats. "On May 15, 1912, the United States Hydrographic Office recommended to the Navy Department that, in order to assist in safeguarding life and property, one or more suitable vessels be detailed to establish an ice patrol in the vicinity of the steamer lanes, and keep in touch with the ice as much as possible and warn vessels of the danger. This recommendation was approved, and the U. S. S. Birmingham and U. S. S. Chester were detailed, the vessels alternating on patrol duty during the 1912 season. In 1913 circumstances did not permit the Navy Department to detail vessels for this duty, and it was undertaken by the United States Coast Guard. As a result of the agitation incident to the loss of the Titanic an International Conference for the Safety of Life at Sea was convened at London in the autumn of 1913, and on January 20, 1914, fourteen nations signed a pact whereby they agreed, among other things, to establish and maintain a continuous patrol of the area of the North Atlantic most endangered by ice during the ice season. The United States was asked to undertake the management of this service, each of the contracting powers agreeing to bear its share of the cost of the patrol in proportion to its shipping tonnage. The United States Coast Guard was charged with the duty of conducting the ice patrol, and since 1913, excepting 1917 and 1918, has been collecting data concerning the movements of ice and currents in the vicinity of the Grand Banks from which certain conclusions may be drawn.

"Ocean currents are the main factors which determine the general drifts of icebergs. Except in their advanced stages of melting, or when surrounded by heavy field ice, bergs are so massive that the direct effect of the wind

(*Just turn the page*)



200 FOOT HIGH ICEBERG SIGHTED BY THE ICE PATROL JUST SOUTH OF THE GRAND BANKS. This was evidently a rather old berg because of the ragged skyline and the cove along the water line. This berg was 650 feet long, and, as seven-eighths of the volume of an iceberg is below water, it probably went as far as 600 feet below the surface.

MAP SHOWING SOURCE OF ICEBERGS. Most of the bergs that menace ships in the Northern Atlantic have their origin when they break off from the glaciers along the west coast of Greenland and the east coast of Baffin Land. (Prepared by U. S. Navy Hydrographic Office).

W. J. Humphreys

Meteorological Physicist of the United States Weather Bureau.

Says

CLIMATE Through the Ages

A Study of the Climatic Factors and Their Variations

By C. E. P. BROOKS

M.Sc., F.R.A.I., F.R.Met. Soc. Author of "The Evolution of Climate"

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Icebergs

(*Continued from page* 175)

is comparatively small, and thus it follows from their deep draft that the forces controlling the drift must lie some considerable distance beneath the surface of the sea."

But the huge, picturesque icebergs are not the only danger to navigators. "Sea ice," says Lieut. Com. Smith, "is the name given to ice formed on salt water, commonly known to seamen as field ice, and, being flat, it is easily moved by superficial currents and by the prevailing winds. Contrary to popular understanding, however, the winds in the Northern Hemisphere, due to the rotation of the earth, move surface water and ice fields (in open seas) not in the same direction of the wind but 45 degrees to the right of it. A continual drift of field ice, with little interruption, takes place out of the Arctic the year round. In summer, however, due to increased solar warmth, such field ice is quickly dissipated and is found only near its principal sources; but at the approach of winter, air and water temperatures quickly resume subfrigid character in the north. This chilling effect of winter spreads southward to the land areas and the shallow waters lying along the Labrador and Newfoundland shelves, thus giving a condition not only productive of field ice but favorable to its survival, even over the coastal banks south and southwest of Newfoundland. On the other hand, the temperature is never low enough in the open Atlantic basin for field ice drifting offshore to survive for more than a brief period. Field ice is, therefore, chiefly restricted to the Arctic and to the coastal shelf.

"Sea ice is believed to play a very important and heretofore unsuspected role in furthering the transportation of icebergs to the southward of Newfoundland. A suggestion even has been made that the iceberg menace to steamships in the North Atlantic would be greatly diminished, or practically disappear, if sea ice did not obstruct the Labrador and Newfoundland coast lines from February to April every year.

"An iceberg is a piece broken off from the ice sheet which covers certain land areas in the far north and south, such as a sheet forming when the temperature is so low that one layer of snow cannot melt before the next fall occurs. As the ice sheet increases in thickness its edges begin to creep towards sea level, urged by the weight of the accumulation of successive centuries of snowfall. Greenland is the highest land in the north, and with the exception of a fringe of its southern coast is covered by a thick ice cap which produces nearly all the bergs seen in the North Atlantic. Practically all of the bergs which constitute the menace to the steamship lane routes of the North Atlantic come from the glaciers fronting along the western coast of Greenland from Disko Bay northward. Bergs that are liberated from the coastal waters of west Greenland in summer and fall accomplish a journey of approximately 1,800 miles before they reach the Grand Banks—the area of shoals and shallow water off the coast of Newfoundland—the following spring and summer, the rate of their drift in the stream current along the Labrador coast being more constant than in the Arctic. From Cape Chidley southwards the bergs tend to hug the Labrador coast, and many ground in consequence. The stranding takes place on a great scale when the sea ice begins to recede northward, exposing more and more of the coast line. Large numbers of bergs gather in the Atlantic off Belle Isle every summer, and a few are sent through the Strait into the Gulf of St. Lawrence.

"The iceberg season may be said to cover a period of about four months, March 15 to July 15. The bergs de-

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PHYSIOLOGY

Measure Area Of Body

How many yards of skin does it take to cover a prize fighter? Though the actual surface area of the svelte flapper of the Occident may have to be inferred from mathematical computation for yet a while, experts at the Imperial State Institute for Nutrition of Tokyo know to the last square inch the body area of ten men they have used as subjects in metabolism experiments.

A special variety of thin strong paper that adheres to curved surfaces very closely was pasted over the nude bodies of the experimentees and dried with a fan, according to Dr. Hideo Takahira, who conducted the measurements. When dry the paper was removed, cut up into flat pieces and measured. The different anatomical divisions of the body were marked off so that the area of each could be recorded and the ratio of each to the whole surface noted. Thus the "area" of Dr. Takahira, who used himself as a subject for measurement, and who is a man about five feet six inches in height, was found to be approximately 18 square feet.

In working out nutritional problems to find out what and how much we should and should not eat, precise quantitative knowledge of the area of the body is a necessary piece of data, but it has never before been ascertained with such precise accuracy. Western investigators have estimated the body surface from measurements of weight and height, but Dr. Takahira was able to check up the accuracy of these various formulae and test their applicability by his actual measurements.

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PSYCHOLOGY

Tabs on Restless Sleepers

The efficiency of beds, springs and mattresses in promoting sleep has been the problem of a long systematic investigation by H. M. Johnson and G. E. Weigand at the Mellon Institute, Pittsburgh. They worked on eighteen young men who were hired to sleep their way through college. Recording apparatus attached to their beds recorded every movement during the night. Surprising differences were found in the restlessness of various individuals yet each stuck closely to his particular habit. The most active man stirred once every eight minutes on the average while the least active usually remained still for twenty-five minutes. The general average for the sleeping squad was about thirteen minutes between stirs.

Science News-Letter, March 19, 1927

PSYCHOLOGY

LIGHTNER WITMER

Psychological Clinician

Psychological clinics, where mother can take Johnny to find out why he's backward in school, or what the best way is to develop his particular talents, are now a common part of college departments of psychology, but thirty years ago there was only one in existence. That was at the University of Pennsylvania, started in 1896 by Dr. Witmer, and which has been actively functioning ever since. As the parent of the psychological clinics, it has given training to men and women now successfully conducting clinics throughout the country.

When Dr. J. McKeen Cattell, who founded the department of psychology at the University of Pennsylvania, went to Columbia in 1891, Dr. Witmer succeeded him as director of the department and laboratory. This was just after his return from Leipzig, where he had studied under Wilhelm Wundt, one of the founders of the modern science of psychology, and received his Ph. D.

Besides his duties at the University of Pennsylvania, his alma mater, Dr. Witmer has found time to establish psychological laboratories at Bryn Mawr College and Lehigh University, to serve as psychologist of the Pennsylvania Training School for Feeble-Minded Children, to found and edit *The Psychological Clinic,* to write a text-book, "Analytical Psychology" and to serve during the war as major and deputy commissioner of the American Red Cross to Italy.

Science News-Letter, March 19, 1927

ELECTRICITY

New "Microammeter"

An electric current so small that at the pressure and price of the ordinary house lighting current it would cost less than a four billionth of a cent an hour, can be measured with the aid of a new instrument just developed in the standardizing laboratory of the General Electric Company at Lynn, Mass. It is known as a thermionic microammeter, and a current of a ten-millionth of an ampere is sufficient to carry the pointer completely across the dial, while a single division on the scale represents one five-hundredth of this amount.

The instrument will be useful in measuring the minute currents in insulators and radio tubes, but it is stated that the chief application foreseen at present will be in combination with a photo-electric cell for accurate measurements of illumination. At present, the intensity of electric lights, for example, is measured by visually comparing them with another light of standard brightness. The electrical eye, the photoelectric cell, may now replace the human eye in this work, for the cell converts light energy into tiny electrical currents, which may be easily measured with the new instrument.

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BACTERIOLOGY

Tick Virus Studied

Gradually science is uncovering every step in the complicated life history of the tick that causes Rocky Mountain spotted fever. Dr. Roscoe R. Spencer of the United States Public Health Service, who has already revealed much of the complex cycle of the organism causing the deadly disease, now states that the virus has a dormant stage in hibernating ticks. At this period the virus is not capable of producing the disease but will frequently confer immunity when injected into guinea pigs. In the spring after hibernation, when the ticks have had a meal of blood from an animal victim, the virus undergoes a highly fatal phase but at this time a protective vaccine can be prepared from it. When it has been transferred to an animal's blood by the tick's bite it is less virulent than the active tick virus, but at this stage no protective vaccine can be made from it.

Science News-Letter, March 19, 1927

Quill pens were introduced in the sixth century.

PHOTOGRAPHS OF SCIENTISTS

Science Service has a collection of nearly 2,000 photographs of scientists throughout the world. The seventh installment of this list is published below. Although this list has been checked with care, corrections are requested, since a complete catalog will be issued later. Photographs of scientists not listed are desired.

For the convenience of teachers and scientific enthusiasts, these photographs are offered for sale. Any ten photographs (each postcard size 3⅛ x5⅜ inches) will be sent postpaid for only $2.00. Enlargements, 8 x 10 inches, are $1.00 each postpaid. Postcard pictures are finished only in black and white, but enlargements are offered either in black and white or sepia on buff stock. Please specify which.

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1253 Langley, Wilson D., University of Pennsylvania, Chemistry
6008 Langmuir, Irving, Physics, G. E. Research Laboratory, N. Y.
730 Langstroth, L., Univ. of California Med. School
429 Langworthy, O. R., Anatomy, Johns Hopkins Univ.
838 Larson, C. W., Dairy Division, U. S. Dept. Agric.
10043* Lavosier
252 Lawson, A. C., Geology, University of California
147 Leathers, A. W., Collector M. B. L., Woods Hole, Massachusetts
434 Lee, F. W., Elec. Eng., Johns Hopkins University
941 Lee, Oliver J., Yerkes Obs., Williams Bay, Wis.
17 Lefevre, George, Zoology, University of Missouri
230 Legge, R. T., Hygiene, University of California
1349 Lehmann. Ernst, Genetics, Universitat Tubingen, Germany
1441 Lehmann, F. E., Zoology, Univ. of Zurich, Switzerland
777 Lehmer, D. N., Mathematics, Univ. of California
1019 Lemaitre, G., Mathematics, Rome, Italy
1457 Lenher, Victor, Chemistry, Univ. of Wisconsin
310 Lenox, L. R., Chemistry, Stanford University
779 Lenzen, V. F., Physics, Univ. of California
2056 Leonard, Clifford S., Chemistry, Yale University
878 Lepkovsky, Samuel, Agr. Chemistry, Univ. of Wis.
766 Lesley, Margaret M., Cytology, Univ. of Calif.
251 Leuschner, A. O., Astronomy, Univ. of California
692 Levine, Victor E., Biological Chemistry, Creighton University
609 Lewis, A. B., Ethnology, Field Mus. of Nat. Hist.
860 Lewis, E. G., Obstetrics, Med. Sch. of Tulane Univ.
1444 Lewis, Park, Oculist, Buffalo, N. Y.
266 Lewis, E. P., Physics, Univ of California
214 Lewis, G. N., Chemistry, Univ. of California
113 Lewis, I. F., Botany, University of Virginia
115 Lewis, Mrs. W. H., Anatomy, Johns Hopkins Univ.
582 Lewis, W. Lee, Chemistry, Northwestern Univ.
6078 Liddell, Mark H., Philology, Purdue University
1 Lillie, F. R., Zoology, University of Chicago
24 Lillie, R. S., Physiology, University of Chicago
700 Linn, R. K. S., Physiology, Med. Research Inst., China
564 Linell, E. A., Anatomy, University of Toronto
4 Linton, E., Zoology, University of Missouri
604 Linton, Ralph, N. A., Ethnology, Field Museum of Natural History
194 Lipman, C. P., Plant Physiology, Univ. of California
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823 Lippincott, William A., Poultry Husbandry, University of California
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6079 Littell, F. B., Astronomer, U. S. Naval Observatory, Washington, D. C.
442 Little, C. C., Genetics, University of Michigan
1281 Liu, C. L., Biology, Tsing Hua College, Pekin, China.
1247 Livingston, Alfred E., Pharmacology, University of Pennsylvania
1357 Livingston, B. E., Plant Physiologist, Johns Hopkins University
977 Lloyd, F. E., Botany, McGill University., Canada
727 Locke, Charles E., Surgery, University of California Medical School

(To be continued)

SCIENCE SERVICE

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Icebergs

(*Continued from page* 176)

crease in numbers noticeably after the middle of June, and from the middle of July on until the following spring the area south of the Grand Banks is practically free from them. An isolated berg or two may drift down to the Tail, the southern tip of the Grand Banks, but not often south of it, as late as October. After that month it is unusual to sight bergs in the latitude of the Grand Banks until the following February.

"The manner and rate of disintegrations of bergs in the mixed waters around the Tail of the Grand Banks is interesting. A berg melts most rapidly just below the water line, and when south of the Grand Banks more rapidly below the surface of the water than above. A berg which drifts south along the east side of the Grand Banks, except late in the season, is surrounded by water of a temperature lower than 35 degrees Fahrenheit until after it passes the Tail. Disintegration under such conditions is rather slow, but in the mixed water and in the Gulf Stream south of the Grand Banks it is accelerated.

"Disintegration is also accelerated by high waves and heavy swell, the effects of which are noticeable on bergs which drift wide offshore in the Atlantic in early season.

"A berg of average size in the mixed waters south of the Tail of the Grand Banks will survive as a menace to navigation for a period of 12 to 14 days during April, May and June, but will not survive longer than 10 to 12 days thereafter. A medium-sized berg farther south within the confines of the Gulf Stream will survive approximately 7 days. This figure, however, may be open to wide variation, as witnessed by the Ice Patrol in June, 1926, when a huge berg 382 feet in length, floating in the northern edge of the Gulf Stream south of Newfoundland, completely melted away in 36 hours. On the other hand, during this same year and month there is an authentic report of a piece of ice, 30 feet in length, 15 feet in width, and showing 3 feet out of water, which was sighted not far from the tropical island of Bermuda.

"The Arctic ice menace looms very large in some years while in others it has sometimes been barely traceable. As an example of the great annual variations to which it is subject, the records show that in 1912 there were approximately 1,200 icebergs that

(*Just turn the page*)

ENTOMOLOGY

Fight Tsetse Fly

Voluntary organization of African natives in a war against the insect which is holding back the development of the continent of Africa, is the feat reported by C. F. M. Swynnerton, British entomologist, in a recent lecture in Washington.

The tsetse fly, carrier of two forms of sleeping sickness and of a disease fatal to domestic animals, is the root problem to be faced by the countries holding African mandates. It must be satisfactorily settled, Mr. Swynnerton said, before the potential value of Africa as a source of raw materials, a market for manufactured goods, and a refuge of surplus populations, can be realized. It has already invaded large areas of the continent and is spreading rapidly.

The tsetse fly, a relative of the house fly, prevents the keeping of cattle in infested areas. This one effect of its presence is sufficient to hamper seriously ary attempt at developing the country, Mr. Swynnerton said. It is even held responsible for immorality of the natives. In Africa cattle are dowry. Without cattle there can be no dowry, hence no marriage.

Mr. Swynnerton has for some time been experimenting in Tanganyika territory with methods of fly control, and has succeeded in arousing the enthusiasm of the natives and in teaching them to help themselves. The dependence of the tsetse upon sheltering woody growth has been Mr. Swynnerton's point of attack. He has showed the natives the necessity of cooperative grass fires over a large extent of country at the end of the dry season. These fires will clear great areas of the tsetse. Those remaining will congregate in grasslike thickets which have not been burned through and can be caught before they disperse.

The advance of the bush means advancing infestation and is the cause of sudden depopulation of formerly uninfested areas. Instead of retreating before the onslaught of the tsetse, Mr. Swynnerton has shown the natives how to take the bull by the horns and keep down the bush by cutting. The response has been hearty. Natives have organized by thousands as if for war, and under his leadership, have saved their lands by exterminating the advancing bush.

Another important part of Mr. Swynnerton's policy is to encourage

(*Just turn the page*)

ASTRONOMY

Nebulae Stages In Evolution

The spiral nebulae in the sky, recently shown by an American astronomer, Dr. Edwin Hubble, of the Mt. Wilson Observatory, to be systems of stars like the one of which the sun and other visible stars and the Milky Way are parts, show an almost continuous series of stages in the evolution of stars. This is the opinion of Dr. J. H. Jeans, leading British astronomer, expressed in the scientific magazine *Nature*.

Commenting on a recent paper of Dr. Hubble's, Dr. Jeans states that "he paints a most fascinating picture of the system formed by the great nebulae, and frames it in such convincing observational evidence that it would be difficult to reject it.

"As seen in a telescope, the great nebulae differ widely in shape, size and brightness. But Dr. Hubble brings a mass of evidence to prove that differences in size and brightness between nebulae of the same shape are almost entirely due to a distance effect. If all the nebulae were put in a row at the same distance from us, it would at once be seen that nebulae of the same shape all had approximately the same dimensions and luminosity, while even nebulae of different shapes would exhibit only comparatively small ranges of dimensions and luminosity, especially the latter."

As a result it is possible to estimate the distances of all the nebulae, even the very faintest that can be seen with a powerful telescope. The faintest that can be observed with the great 100-inch telescope at Mt. Wilson, the world's largest, prove to be so distant that light takes 140,000,000 years to reach us from them, traveling about six trillion miles a year. Some two million nebulae lie within this distance, at an average distance of about 1,800,000 light years apart.

Dr. Jeans suggests a model of this vast horde of galaxies. "Take 20 tons of walnuts," he says, "and space them at about 25 yards apart, thus filling a sphere of about a mile radius. This sphere is the range of vision of the 100-inch telescope; each walnut is a nebula containing matter enough for the creation of perhaps a thousand million suns like ours; each atom in each walnut is a solar system with a diameter equal to that of the earth's orbit."

It is almost certain, says Dr. Jeans, that the various forms of

(*Just turn the page*)

Nebulae

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nebulae represent different stages in evolution, and, incidentally, agree with the sequence which he suggested in 1917 on theoretical grounds. Starting out with a sphere of gas, it changes to an onion-shaped mass, which mathematicians call an oblate spheroid, and then to a lens-shaped figure. Then the gas streams out into two arms where it condenses into many smaller masses which eventually become stars. Finally the whole cloud of gas has been transformed into a cloud of stars.

As these nebulae are approximately equally spaced as far as we can see into the heavens, Dr. Jeans suggests that the nebulae themselves are the result of the condensation of a still earlier cloud of gas hundreds of millions of light years in diameter and extremely tenuous. Such a gas would have had a density expressed as a fraction of that of ordinary air by the figure one over a one followed by 31 ciphers. This scheme, he points out, fits in with the law of gravitation, the known properties of gases, and survives the test of numerical computation.

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Tsetse Fly

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the natives to settle close together. This system of living is in itself a safeguard against the tsetse. By congregating, the population is sufficient to keep down the bush for natural uses such as firewood, building and agriculture.

"Africa can never be developed adequately while the tsetse remains in possession," Mr. Swynnerton said. "I have shown that the case is by no means hopeless. What we now want are men who, trained at the stations where work is already proceeding, will go thence to new areas, study conditions and right combinations of measures for each and extend the campaign throughout the tsetse-ridden half of Africa."

Science News-Letter, March 19, 1927

A wheel that makes almost 700 revolutions a second was used on the airplane in which Lieut. John Macready made his recent altitude test flight.

Students of the University of Rio de Janeiro have petitioned that standard German medical books be translated into Esperanto, so that they may be read more easily.

Icebergs

(*Continued from page* 179)

drifted south into the Atlantic, while in 1924 there were only 11."

The sailor of story books who could "feel" the presence of icebergs long before they were sighted seems to be a figment of the imagination of some fiction writer, for there is ordinarily no appreciable cooling of the air near a berg, says Lieut. Com. Smith. Nor does a sudden cooling of the water necessarily mean the presence of one, for the water temperature does not change appreciably in their proximity either. However, when a ship passes out of the warmer water south of the Grand Banks and into the colder region where the Arctic waters mix with the tropical currents, the water temperature may in winter drop as much as from 54 to 32 degrees Fahrenheit in a ship's length. When this happens, the navigator knows that he is in a region of possible iceberg danger.

Small forms of aquatic life, called plankton, are so numerous in these Arctic waters that the ocean sometimes takes on a green color and has a fishy smell, but these do not necessarily indicate the presence of an iceberg either. Birds sometimes roost on the bergs, but they are often seen far from any ice. The common ideas of seals disporting themselves on icebergs are also wrong, says Lieut. Com. Smith, for a seal would be unable to climb on a berg.

Rapidly vibrating sound waves, emitted from under-water apparatus. may be used to indicate the presence of the dangerous ice when the waves are reflected back to the ship, but this method is still in the experimental stage. The best way of locating them is by a lookout, preferably located in a crow's nest on a mast. From such a point of vantage they can be sighted 12 to 15 miles away, and they have been sighted when as distant as 20 miles, while the man on the bridge cannot see them farther than about 10 or 12 miles. In a dense fog, they may not be seen until within a hundred yards, though on a dark, starlight night they may be seen when as much as a fourth of a mile distant. On a moonlight night, they can be seen as far as 8 miles, and are conspicuous at 5 miles, while on a clear moonless night, with the aid of a searchlight, they may be located when 2 miles away.

Science News-Letter, March 19, 1927

A reinforced concrete chimney 400 feet high, said to be the tallest of its kind in America, was recently built at Trail, B. C.

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PALEONTOLOGY

More Fossil Footprints

New finds of fossil footprints of extinct animals, indelibly printed on slabs of solid stone, have recently been brought to Washington by G. F. Sturdevant, ranger naturalist of Grand Canyon National Park, and deposited with Dr. Charles W. Gilmore at the U. S. National Museum. One of the specimens is of a greater age than any hitherto discovered at the Grand Canyon, belonging to the Cambrian age, before any four-footed backboned animals had appeared on earth. The tracks are small, sharp prickings in the sandstone, with no trace of toes, and between them trails a sinuous double furrow, as though some part of the animal's body had dragged through the sandy mud. It is probable that the creature that made them belonged to the zoological group now represented

(*Just turn the page*)

ENTOMOLOGY

Insect Mutts And Jeffs

Enter the beetle pycnic and the dragon fly asthenic! Not content with dividing men up into digestive, muscular and other types, scientists now classify insect physiognomies according to the same rules.

The "pycnic," says Dr. William Morton Wheeler of the Bussey Institution for Research in Applied Biology, in the Quarterly Review of Biology, is not so called because he likes picnics, though he often does, but from a Greek word meaning compact or thickset. The "asthenics" are the thin, intense, intellectuals with the characteristic lean and hungry aspect Shakespeare attributes to Cassius. In between these, says Dr. Wheeler, are the "athletics," the large class into which fit people with organs of more nearly average development.

Insect Mutts and Jeffs are represented by plenty of chunky, round, "pycnic" beetles, bugs, and moths while "asthenic" grasshoppers, mosquitoes, walking sticks, and dragon flies, he continues, can be found in quantity any summer day. In the insect world as among humans, however, the intermediate types predominate in numbers, "and if I designate this group as athletics," adds Dr. Wheeler, "the economic entomoligsts who spend their lives ardently and often unsuccessfully wrestling with them will certainly not object."

EDUCATION

Exam System Needs Revision

The hated "exam" has been brought under the spotlight by Prof. Ben D. Wood of Columbia University. A survey of examination files of 65 of the best and largest institutions holding membership in the American Association of Collegiate Registrars shows a dire need of reformation in examination systems, he states.

Not only did he learn that examinations are often inaccurately prepared and without expert advice, but he found that the comments put upon the papers by the instructors indicate that they were employing the moralistic, disciplinary powers of examinations rather than their value in measuring achievement.

The survey also showed that there is no basis for comparison of marks in different colleges or even in different departments of the same college, so individual are the methods of making up the examinations, and also of scoring them.

(*Just turn the page*)

BIOLOGY

Fishes Eat More when Warm

We eat heavy beefsteak dinners during the cold weather but when summer comes along it is salad and lemonade and the lighter foods that we choose. Not so with the fishes. Unlike the warm-blooded animals, the fishes seem to require more food, rather than less, in warm weather. Experiments testing the appetites of fishes in different temperatures have been performed by Dr. Edward S. Hathaway of Tulane University.

"The fishes used in these experiments were bluegills, pumpkinseeds, and large-mouthed black bass," Dr. Hathaway says. "Fishes which had been living in the laboratory at a temperature of about 68 degrees Fahrenheit were tested for a week at that temperature, and their rate of food consumption was determined. They were then transferred to a temperature of 50 degrees Fahrenheit, at which they were kept for three or four weeks, after which they were returned to the original temperature for two weeks more.

"At the time of transfer from the warmer to the cooler water there was a sudden loss of appetite, the food consumption falling to about one-third the original amount; when the fishes were replaced in the warmer aquaria their rate of food consumption increased again, so that, within two weeks, they equalled or exceeded their original rate.

(*Just turn the page*)

HYGIENE

Co-Eds Best Physically

Factory work is apparently no competitor with organized athletics in building up muscles of the feminine physique. Dr. Edward P. Cathcart, professor of chemical physiology at the University of Glasgow, has just conducted a survey of over 3,000 women in factories both here and in London and in the industrial section of the north of England, to determine how heavy a weight women are physically capable of carrying. A group of over 400 college girls examined as controls were relatively taller and heavier than their industrial sisters, he found, and were excelled in strength by only a few physically superior groups in certain industries.

Though scientists have determined down to the last ounce how much a soldier's pack should weigh, there have been no measurements of women made from which social workers could estimate a maximum load for women which should not be exceeded, Dr. Cathcart declared. The average British woman in industry, he has found from the results of his survey, weighs approxi-

(*Just turn the page*)

BIOLOGY

"Soft" X-Rays Kill Germs

"Ultra-soft" X-rays, radiations that occupy an intermediate position between the invisible ultra-violet light that lies above the ordinary visible spectrum and the "harder" X-rays ordinarily used in surgery and scientific investigation, have been found to be a potent means for killing bacteria, according to Dr. W. Schepmann of Berlin. Their existence has long been known, Dr. Schepmann states, but their properties have never been thoroughly investigated, especially as concerns their physiological effects.

Ultra-violet rays kill germs in a few seconds, and they have long been employed as germicidal agents, but their penetration into water is so small that their usefulness has been limited. X-rays, on the other hand, have great penetration, but it takes hours for them to kill bacteria. The ultra-soft X-rays are intermediate in both penetration and rapidity of action. They do not penetrate so deeply as the regular X-rays, but they do pierce liquids far enough for practical purposes, and instead of hours they require only minutes for thorough sterilization.

Co-eds Best

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mately 109 pounds, is 62 inches tall, and has a pull of 183 pounds, a grip of 58 pounds and a crush of 50 pounds.

A specially constructed dynamometer was used to measure the pulling capacity in the tests in which Dr. Cathcart was assisted by Elizabeth Bedale and Dr. Katherine Macleod.

In the brick-laying industry, the observers saw one woman who shoveled twenty to twenty-five tons of raw material a day, lifting it to a height of two and a half feet. Girls in the same business as a rule carried over 100 pounds at a time, though they were allowed to select their own load. The average age of the women in factories Dr. Cathcart and his collaborators found to range between 17 and 22 years.

Science News-Letter, March 19, 1927

New York City has 23 playgrounds where children whose mothers work may be cared for all day.

An entirely new American insect pest, a beetle from Japan, has been reported in New York and New Jersey.

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Exam System

(*Continued from page* 181)

"There is no evidence," Prof. Wood said, "that college teachers appreciate the fact that real measurement necessarily involves a universally understood unit reckoned from a stable and universally understood point of reference. Unless college grades afford accurate measurement of defined achievements, expressed in terms of units which have definite meaning to all competent educators, they will not serve the constructive purposes which constitute the most legitimate excuse for having grades in our educational system at all.

"The appointment of a strong committee in each college to investigate the local situation and to make available the results of investigations and experiments in other colleges would seem to be the minimum obligation of the college administrators who face the facts disclosed by the survey."

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Fishes Eat More

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"Incidentally it was noted that young fishes ate much more in proportion to their size than did the older ones. For example, the average yearling pumpkinseed at 68 degrees Fahrenheit ate about one-sixteenth of its body weight per day, while the two-year-olds consumed, on the average, only about one-fiftieth of their body weight per day."

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Do You Know That—

The useful tree frog eats insects pests, flies, and mosquitoes.

About 14 per cent of the world's zinc is produced electrolytically.

A peculiarity of Siamese cats is that their hair grows darker in old age.

The Roman Emperor Heliogabalus once served 600 ostrich brains at a banquet.

Aluminum paint is used on oil tanks, boilers, and steam pipes to reduce heat losses.

At the age of fourteen, Count Rumford calculated an eclipse of the sun within four seconds of accuracy.

A new steel helmet suggested for use by American soldiers resembles the high crowned helmets worn by medieval warriors.

Fossil Footprints

(*Continued from page* 181)

by crayfishes, scorpions and insects. The age in years of these tracks is so great that it remains largely a matter of conjecture; thirty-five millions of years has been suggested as a conservative estimate.

The second slab is only about half as old, belonging to the Pennsylvanian or upper coal-age level. The tracks on this are of an animal with well-developed toes, probably of the group represented by the modern frogs and salamanders. Though distinct from other tracks previously reported from the Grand Canyon, they bear a sort of family resemblance to them.

Dr. Gilmore states that he intends to spend some time at the Grand Canyon during the spring or summer, investigating these tracks and seeking for new material.

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A breast fed baby has six times as much chance to resist illness as a bottle baby, says a child specialist.

Thermometers are being set into deep coal piles in order to warn the owners of overheating and spontaneous combustion.

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BIOLOGY

NATURE RAMBLINGS

By FRANK THONE

55

Coal Age Relics

"Equisetum" — "horse-bristles" — the ancients called them, so do the learned botanists call them still; "horsetails" they are to us. Except that a generation of children, now almost vanished before the oncoming of central heating, used to know them as "stovepipes" because their stems could be taken apart and put together again so neatly. Fairy stovepipes they must have been, however, burning white coal, for there was never any soot in them.

Their connection with household heating, however, is more intimate than the fancied resemblance of their stems to flues. Many and many a fossil horsetail stem has gone up a real stovepipe as real smoke. For the vast, weird forests of the Coal Age were in part made up of close relatives of these queer little plants, whose matted remains are now sold and burned by the ton, with little attention to the fluted lines and little leaf-fringes that may be traced where a lump has split.

These horsetails of the past were not all little fellows like their survivors. There were giants in those days: horsetails with trunks a foot in diameter, sprawling along the ground or scrambling into the air for thirty or forty feet. But the giants, for some unknown reason, became extinct, and only the dwarfs remained, to be shouldered unceremoniously into ditches and waste places by plants of a later evolution. Still they survive; they have seen the coming of the dinosaurs and their departure, and the advent of the mammoth and the mastodon and their passing also. Who knows but that, having seen the beginning of our race they may not outlive us as well?

Science News-Letter, March 19, 1927

Buckets, dippers and pitchers are now being made of hard rubber.

Chestnut trees killed by blight are still valuable as timber for a year or two.

ETHNOLOGY

Great God Gasoline

The Baku region, the magnet that is drawing the oil interests into the East, was the center of the fire worship of the ancient Magi.

In a history of fire as an agent in human culture just issued, Dr. Walter Hough, head curator of anthropology in the U. S. Natjonal Museum, reveals that a Parsee fire temple near Baku made the first recorded use of natural gas about the beginning of the seventh century. According to one account, the gas well was ignited by accident and continued to burn in the shrine that was built over it for over a thousand years.

The discovery of petroleum in North America during the nineteenth century, Dr. Hough points out, probably saved the whale from extinction since it put an end to the great whaling industry which had developed out of the use of sea-oil lamps. A unique torch used by the natives of the Orkney Islands, utilizes the body of the stormy petrel for illumination. The sea bird's body is so impregnated with oil that it makes a good light. The burning is sometimes facilitated by the insertion of a wick, thus making a true lamp.

The first people to use coal for fuel, according to Dr. Hough, were the Pueblo Indians of Arizona. It was dug out of nearby veins for firing pottery but as far as can be ascertained was used only for this purpose. This sporadic use of coal antedated by many centuries its employment for fuel by civilized man.

Roman houses were heated by a kind of hot air furnace system of pipes that conducted heated air through the rooms from a subterranean furnace. During the supremacy of Rome, also, olive oil formed the basis of one of the greatest developments in the history of illumination, declares Dr. Hough. The use of the oil burning Roman lamp extended throughout the regions bordering on the Mediterranean, dating from the time when the empire became developed sufficiently along economic lines to have an excess of oil over what was needed for food.

Science News-Letter, March 19, 1927

Most young animals lose their milk teeth and get a second set, like human beings.

Blue and orange filters to lessen the glare of automobile headlights have been proposed.

SEISMOLOGY

Earthquake Not Unexpected

While no special prediction had been made of its occurrence, the earthquake which shook Osaka, Kobe, and other points in Japan on Monday, March 7, was not entirely unexpected, Commander N. H. Heck, in charge of the U. S. Coast and Geodetic Survey's seismic investigation, states. Commander Heck has recently returned from a trip to Japan. When there he visited Osaka with Prof. Matzuyana, of Kyoto University, one of the leading Japanese seismologists, and looked over the very site where great damage was done. Both he and Prof. Matzuyama recognized the possibility of a quake there, he said.

Though considerable damage was done on land, the quake was probably centered in the Pacific Ocean off the Japanese coast, said Commander Heck, after studying earthquake reports gathered by Science Service. The location of the center appeared to be at about 34 degrees north latitude and 137 degrees east longitude, he said. This was based on records obtained by seismographs at Georgetown University, Washington; Fordham University, New York; the Dominion Observatory, Ottawa, Canada; the U. S. Weather Bureau, Chicago, and the stations of the Survey at Cheltenham, Md., and Tucson, Ariz.

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AGRICULTURE

Edison-Ford Rubber Vine

The Madagascar rubber vine, with which Edison is experimenting as a possible source of tires for the products of Ford, is a relative of the common milkweeds, according to Dr. O. F. Cook, senior botanist of the U. S. Department of Agriculture. About four per cent. of the total weight of the plant is rubber, and the product as exported from Madagascar has been considered of good quality, though not equal to the rubber of the Brazilian Hevea tree. The lower quality, however, may possibly be due to the primitive methods now used in obtaining the Madagascar rubber, and more scientific chemical treatment may serve to remedy this. Though no serious efforts have hitherto been made to exploit the vine commercially, it is known that it will grow freely in southern Florida, and efforts to extend its range northward into the regions of occasional frosts will be followed with interest. The vine belongs to the genus known to botanists as *Cryptostegia*.

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QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering—General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trade.
TX Domestic science.
U Military science. General.
V Naval science. General.

Dewey Classification

The main divisions of the Dewey Decimal Classification, used in many libraries and by many individuals, is given below for the convenience of those who wish to use this system:

000 GENERAL WORKS—
010 Bibliography
020 Library economy
030 General cyclopedias
040 General collected essays
050 General periodicals
060 General societies
070 Newspapers
080 Special libraries. Polygraphy
090 Book rarities
100 PHILOSOPHY—
110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
180 Ancient philosophers
190 Modern philosophers
200 RELIGION—
210 Natural theology
220 Bible
230 Doctrinal. Dogmatics. Theology
240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
260 Church. Institutions. Work
270 Religious history
280 Christian churches and sects
290 Ethnic. Non-Christian
300 SOCIOLOGY—
310 Statistics
320 Political science
330 Political economy
340 Law
350 Administration
360 Associations. Institutions
370 Education
380 Commerce. Communication
390 Customs. Costumes. Folklore
400 PHILOLOGY—
410 Comparative
420 English
430 German
440 French
450 Italian
460 Spanish
470 Latin
480 Greek
490 Minor languages
500 NATURAL SCIENCE—
510 Mathematics
520 Astronomy
530 Physics
540 Chemistry
550 Geology
560 Paleontology
570 Biology
580 Botany
590 Zoology
600 USEFUL ARTS--
610 Medicine
620 Engineering
630 Agriculture
640 Domestic economy
650 Communication. Commerce
660 Chemical technology
670 Manufactures
680 Mechanic trades
690 Building
700 FINE ARTS—
710 Landscape gardening
720 Architecture
730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
770 Photography
780 Music
790 Amusements
800 LITERATURE—
810 American
820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
900 HISTORY—
910 Geography and travels
920 Biography
930 Ancient history
Modern
940 Europe
950 Asia
960 Africa
970 North America
980 South America
990 Oceanica and polar regions

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First Glances at New Books

OEUVRES DE PASTEUR—Edited by Dr. Pasteur Vallery-Radot—*Masson et Cie., Paris.* I. Dissymétrie moléculaire, 11s. 8d.; II. Fermentations et générations dites spontanées, 15s.; III. Etudes sur le vinaigre et sur le vin, £1 10d.; IV. Etude sur la maladie des vers à soie, £1 3s. 4d.; V. Etudes sur la bière, in press; VI. Maladies virulentes, virus-vaccins et prophylaxie de la rage, in preparation; VII. Mélange scientifiques et littéraires, in preparation.

Voila! The testament of the New Dispensation in medicine and sanitary methods, in almost the whole of biology and in wide stretches of chemistry, all codexed with scholarly and beautiful accuracy, and put into print as only a high-grade French publishing firm can do a piece of work when they have their whole heart in it. Dr. Vallery-Radot has performed a great service to science in thus assembling the works of the great leaders in modern biology before they have become too scattered, and possibly clouded by the publication of inauthentic versions. He has scrupulously adhered to the best original texts, and has taken cognizance of variations already in existence in special notes.

By the simple fact of its existence, this edition imperatively demands a place in every scientific library. And the price is so low—only about $16 at current exchange rates, for the four volumes thus far out—that even small libraries can afford to purchase it.

Science News-Letter, March 19, 1927

LIST OF PUBLICATIONS OF THE NATIONAL RESEARCH COUNCIL AND ITS FELLOWS AND PARTIAL LIST OF PAPERS HAVING THEIR ORIGIN IN THE ACTIVITIES OF ITS COMMITTEES TO JANUARY 1, 1926—*National Research Council* (75 cents). A first bibliography of the results of the most important undertakings in national scientific organization.

Science News-Letter, March 19, 1927

A SHORT OUTLINE OF COMPARATIVE PSYCHOLOGY—C. J. Warden—*Norton* ($1). Beginning with man's ideas about animals back in dim prehistoric ages, Dr. Warden traces the story of what philosophers and scientists have believed and discovered about animal psychology, down to the present day school of experimentalists. A compact and simply written resume of a subject that has baffled and fascinated thinkers from ancient times.

Science News-Letter, March 19, 1927

ASTRONOMY: A Revision of Young's Manual of Astronomy; Vol. 1, The Solar System; Vol. 2, Astrophysics and Stellar Astronomy—H. N. Russell, R. S. Dugan and John Q. Stewart—*Ginn* ($2.48 per volume). It isn't often that a scientist welcomes the appearance of a new text-book in his subject as a source of information for himself as well as means of presenting the latest facts to his classes. Young's "Manual of Astronomy" was the standard text book for many years; in this revision by Dr. Russell and his colleagues, it has been completely brought up to date, so as to include the very latest results in astronomical research. Dr. Russell himself has been one of the leaders in many of the advances of the science described in the second volume. He has made it more than a text-book, for here is brand new material that has scarcely yet found its way into the scientific press, yet it is set forth with a simplicity which makes it the best general book on astronomy now in print.

Science News-Letter, March 19, 1927

CATALOGUE OF THE EDWARD E. AYER ORNITHOLOGICAL LIBRARY, 2 vols.—John Todd Zimmer—*Field Museum of Natural History.* An annotated list of one of the most important libraries in its field in America, done in most painstaking and scholarly fashion. It should prove very useful to ornithological students.

Science News-Letter, March 19, 1927

THE NEED OF SCIENTIFIC RESEARCH IN THE FISHING INDUSTRIES—Maurice Holland — *National Research Council* (15 cents). Calls attention to the anomaly of a wealth of fundamental science available for the use of the fisheries industries, with almost no development of a technology for its application.

Science News-Letter, March 19, 1927

CHEMISTRY—M. H. Kessel—*Globe Book Co.* ($.67). First aid to high school students preparing for elementary chemistry examinations.

Science News-Letter, March 19, 1927

A NATURALIST'S PILGRIMAGE — Richard Kearton—*Houghton Mifflin.* The autobiography of a British traveling and lecturing naturalist.

Science News-Letter, March 19, 1927

TIGER TRAILS IN SOUTHERN ASIA —Richard L. Sutton—*Mosby* ($2.25). A hunting excursion in Indo-China pleasantly and entertainingly described.

Science News-Letter, March 19, 1927

METEOROLOGY

The Iceless Arctic

Quotation from CLIMATE THROUGH THE AGES. C. E. P. Brooks. Coleman.

It is possible that the Arctic Ocean again became free of ice during historic times, from about the fifth to the tenth or eleventh centuries of the Christian era. O. Pettersson makes out a good case for the absence of sea ice in the East Greenland Current during the latter part of this period. His map of the old Norse sailing routes shows a track direct from Iceland to the east coast of Greenland in latitude 65° N., then down the coast to Cape Farewell, and up the west coast. According to the documentary evidence which he adduces, this route was followed until nearly A. D. 1200 and for most of the period *there is no mention of ice* in any of the numerous descriptions. From Greenland the Norsemen sailed to Wineland (on the coast of North America), and again there is no mention of ice. Further, it has recently been shown quite conclusively that during the early stages of the history of the "Eastern Settlement" near Cape Farewell in Greenland, the climatic conditions were much more favorable than at present. The soil is now frozen hard throughout the year, but in those days it was not frozen, and the coffins in the burial ground were penetrated by a thick mass of plant roots, indicating a mean temperature above freezing point. This is very striking; Pettersson's own inference is that the ice did not then come so far south as it does now, and it seems probable that the Arctic Ocean was, if not ice-free, at least in the intermediate or "semi-glacial" condition, in which a small cap formed in winter but disappeared completely in summer.

Science News-Letter, March 19, 1927

PHYSICS

Iridium Hardest Metal

Iridium, a metallic element in the same chemical group as platinum, and often used as the tip for fountain pens, is the hardest pure metal, according to tests recently made by A. Mallock, and announced in the scientific magazine *Nature.* Molybdenum is the next hardest, with tungsten third. Nickel is the hardest of the common metals as it ranks fifth, the rare metal rhodium coming in fourth. These refer only to pure metallic elements, for some alloys, such as steel with a high percentage of carbon, rank higher than any.

Science News-Letter, March 19, 1927

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Anniversaries of Science

March 23, 1925—Governor of Tennessee signed act forbidding the teaching of evolution in state supported schools of Tennessee.

Be it Enacted, by the General Assembly of the State of Tennessee, that it shall be unlawful for any teacher in any of the universities, normals, and all other public schools in the State, which are supported in whole or in part by the public school funds of the State, to teach the theory that denies the story of the divine creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals.

March 24, 1849—Johann Wolfgang Dobereiner died. He was the inventor of the Dobereiner lamp.

In 1823 a decided impetus was given to the artificial production of fire by the introduction of the Dobereiner lamp, so called after its inventor, J. W. Dobereiner of Jena. . . . . He noticed that a spongy platinum in presence of oxygen can bring about the ignition of hydrogen, and utilized this fact to construct his "hydrogen lamp," the prototype of numerous devices for the self-ignition of coal-gas burners.

—*The Encyclopaedia Britannica.*

March 27, 1899—Wireless messages first passed between England and France.

Throughout the period of my visit, messages, signals, congratulations and jokes were freely exchanged between the operators sitting on either side of the channel. . . . No familiarity with the subject removes the feeling of vague wonder with which one sees a telegraphic instrument merely connected with a length of 150 feet of copper wire run up the side of a flagstaff begin to draw its message out of space and print down in dot and dash on the paper tape the intelligence ferried across thirty miles of water by the mysterious ether.

—Prof. Fleming of the University College in the *London Times.*

March 28, 1874—Peter Andreas Hansen died. He compiled "Tables of the Moon."

It is our moon's motion which has given most trouble to the mathematical astronomers. Merely to print the algebraic terms representing the moon's motion requires a small quarto volume, and to compute tables from them so as to give accurately the moon's position over a long term of years is the work almost of a lifetime. This task of investigating the motion of the moon was undertaken by Peter Andreas Hansen, Director of the Ducal Observatory of Schleswig-Holstein. His daughter, Mrs. Bayard Taylor, tells in her delightful book how, early in their married life, Hansen attended his sixteen-year-old bride to a ball. She was dancing in her wedding gown of white satin, with a wreath of forget-me-nots in her hair, when suddenly she missed her husband. No one could tell her what had become of him. In her fear for him, she ran alone in her white satin slippers all the way from town up the steep height of the Seeberg, and found her bridegroom at his desk, deep in a problem. The idea had struck him in the midst of the dance, and oblivious of everything, he had rushed home to put it on paper.

—Abbot: *The Earth and the Stars.*

Science News-Letter, March 19, 1927

MEDICINE

Skin Test For T. B.

A skin test for tuberculosis that will detect the presence of the white plague in a patient in the early and curable stages is the object of Dr. Frederick Eberson of the University of California Medical School. Dr. Eberson has been conducting a series of experiments with serum from the blood of tuberculosis patients that indicate that the body creates a substance, as the disease becomes more acute, that will act as a specific test for the disease in other people.

When extracts or serums of this substance, which as yet has not been named, are injected into the blood of a T. B. suspect the appearance of red spots on the skin, according to Dr. Eberson, shows the presence of the disease. He also believes that the virulence of the infection can be determined by the type of the patient's reaction. Laboratory tests indicate that this substance is different from tuberculin, which has been used in a similar way but not with great success.

More accurate and earlier diagnosis of tuberculosis with consequent prompt curative treatment, it is hoped, will be the result of these studies now in progress in the California laboratories.

Science News-Letter, March 19, 1927

Prehistoric forests were often set afire by lightning, but the flames rarely spread widely because the woods were thick, dark, damp, and cool.

Scientific Poetry Prizes

The third weekly scientific poetry prize goes to Prof. W. L. Porter, of Davidson College, North Carolina, for his poem "To A Horse Shoe Crab," given in the next column.

Conditions: Poems, verses, rimes, jingles or what-have-you must be original and unpublished. They must express accurately some scientific fact or situation. Address: Poetry Editor, Science Service, 21st and B Sts., Washington, D. C. Keep a copy, as unavailable contributions can not be returned.

Prizes: One poem will be published each week. A prize of $5.00 will be paid for each poem published.

To A Horse Shoe Crab

This week's prize winning poem in the Science Service scientific poetry contest.

Oh spiny dweller of the deep
Thou canst not run nor fly nor leap,
Nor even swim, but only creep
Along the pebbly shore.

Thou art not beautiful to see,
Thou hast no known utility,
And yet thou seemest here to be
A fixture evermore.

Too slow thou art to make great speed,
Too shelly quite to make good feed,
A theme thou art quite fine indeed
For philosophic thought.

Archaic remnants of the hosts
That dwelt on long departed coasts,
Thou savorest of dreams or ghosts
Of what has long since been.

Why dost thou linger when thy mates
Have cast their reckoning with the fates
And now repose within the gates
Of geologic time?

We boast of our ancestral tree,
It spans a century or three,
Compared with thine it proves to be
A thing of yesterday.

Could we but pierce that crust of thine,
The mysteries that its walls confine,
Of wars with beasts and seas condign,
The pleasure would be ours.

What combats fierce evolved thy mail?
How grew thee such a spindly tail?
Answer but these and we'll not fail
To write a monograph.

But thou art cold and tight and hard,
Thy thoughts and secrets well dost guard,
Thou softenest only to discard
Thy shell when it's too tight.

We leave thee to the struggling swarms
Of animals and winter storms.
Crepidulas and hydroid forms
Are all we ask of thee.

—*W. L. Porter.*

Science News-Letter, March 19, 1927

An attempt is being made to extract the oil from tar sands in Canada.

In a recent experiment, rats were found to be much more active for 20 to 45 minutes after breathing air containing tobacco smoke.

A new motion picture camera for under sea photography is so simply constructed that it can be operated by any motion picture photographer.

The Problem of Translation—

¶Science, probing the unknown universe, writes its findings in cryptic language. A stellar galaxy shining faintly in the heavens hides its splendor and its immensity in numbers and formulæ; a minute germ has thrust upon it a long Latin name. With the aid of such scientific shorthand and such technicalities, science pushes on to new discoveries and new heights.

¶Yet the facts and the methods of science must penetrate and permeate the whole fabric of civilization if the world is to become an increasingly better place to live in. The man in the street, the child in the school, the merchant in the counting house, the judge on the bench, the priest in the temple, all of those who make the world, must know, appreciate, understand and cherish the spirit of research and the power of thought.

¶To *translate* and *interpret* science—that is the function of SCIENCE SERVICE. The thrill and wonder of science reaches two million and a half newspaper readers through SCIENCE SERVICE news dispatches daily. Millions more read SCIENCE SERVICE'S other newspaper articles, its magazine articles and its books.

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